



Michael Faraday - the 'Father of Electricity'

The man who made electricity possible!

Born: 22-09-1791
Died: 25-08-1867

A blacksmith's son, Michael Faraday was born on 22 September, 1791, at Newington, Surrey (now Southwark), London. Faraday began his career as a bookbinder. Later, on 1 March, 1813 he was engaged by the managers of the Royal Institution as a Laboratory Assistant. Faraday's thirst of knowledge and deep interest in 'science' soon found him appointed as an Assistant to Sir Humphry Davy, the noted English Chemist. He toured widely in Europe with Sir Humphry during 1813-1815 and an enlightened Napoleon allowed the visit even though Britain and France were at war. The travels had a tremendous educational impact on Faraday, motivating him to carry out his own researches later.

In 1821, Faraday discovered the principle of electric motor and built a primitive model of one. Two years later he was the first to liquify Chlorine. Convinced of the interrelation of electricity and magnetism, on 29-8-1831 he discovered the phenomenon of electromagnetic induction -- the production of electric current by a change in magnetic intensity: the discovery that revolutionized the world and Faraday came to be known as "the man who made electrical engineering possible..." - a statement made by Sir William Bragg in 1931 on the occasion of the celebration marking the centenary of the discovery of electromagnetic induction. In 1833, Faraday was appointed professor of Chemistry at the Royal Institution.

Among his other accomplishments, Faraday produced the first dynamo, stated the basic laws of Electrolysis, discovered that a magnetic field will rotate the plane of polarisation of light, and discovered, Benzene.

Lord Rutherford, the great English Scientist who split atom towards the beginning of the nineteenth century, wrote about Faraday: "The more we study the work of Faraday with the perspective of time, the more we are impressed by his unrivaled genius as an experimenter and natural philosopher. When we consider the magnitude and extent of his discoveries and their influences on the progress of science and industry, there is no honour too great to pay to the memory of Michael Faraday..."

Of many tributes paid to his memory, the unit of electric capacitance has been named as Farad.

Faraday died on 25 August, 1867, at Hampton Court, Surrey, England.

Faraday's Laws of Electromagnetic Induction (discovered in 1831) are :

1. a changing magnetic field induces an electromagnetic force in a conductor;
2. the electromagnetic force is proportional to the rate of change of the field;
3. the direction of the induced electromagnetic force depends on the orientation of the field.

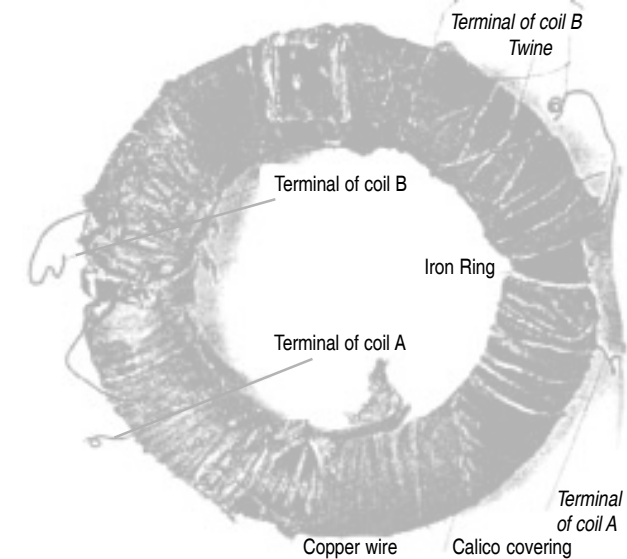
Faraday's Laws of Electrolysis (discovered in 1832-33) are:

1. the amount of chemical change during electrolysis is proportional to the charge passing through the liquid;
2. the amount of chemical change produced in a substance by a given amount of electricity is proportional to the electro-chemical equivalent of that substance.



The Institute of Electrical and Electronics Engineers, Inc.

HYDERABAD SECTION, India



[The 'RING' used by Faraday to "establish" his laws]

Commemoration of The Genius!

Nineteenth FARADAY MEMORIAL LECTURE

Tuesday, 22nd September 2009

at

**BM Birla Science Centre
Adharsh Nagar, Hyderabad**

Today, mankind lives in the world of all kinds of comfort that could not be imagined even a decade ago. These have come about owing to the phenomenal progress of technology. The key to all technological developments has been the phenomenon called electricity.

Generation of this magic element that is electricity is due to the genius of **Michael Faraday**, an English 'Scientist' who invented the fundamental laws of Electromagnetic Induction more than 150 years ago. No wonder the man has always been known as the "Father of Electricity"! The IEEE Hyderabad Section launched the Annual Faraday Memorial Lecture in 1991, the year of 200th birthday of Michael Faraday, to

commemorate his genius, *especially aimed to benefit young students of science and engineering and general public.*

Since then the Section has organised the lecture jointly with Birla Science Centre, Hyderabad, held on 22nd September every year. The speakers have been eminent power engineers and scientists, from within India and abroad. Notable among these were Prof. M. Ramamurthy, Prof. Amulya K.N. Reddy, Prof. P.V. Indiresan, Dr. K. Kasturirangan, Prof. C.C. Chan, Prof. M. Poloujadoff, Prof. Bimal K. Bose, Dr. Chandra Krishnaya, Prof. Arun G. Phadke, Prof. Keene M. Matsuda and Padmasri (Prof.) B.L. Deekshatulu, Dr. V. Prasad Kodali, Prof. Ganti Parsad Rao, Prof. V. Umapathi Reddy, and Dr. Ashok Jhunjhunwala.

You are cordially invited to

the 2009 Faraday Memorial Lecture
**Current, if not obstructed, will always
flow in the "Path of least impedance"**

by

Mr. Elya B. Joffe

at

BM Birla Science Centre
Adharsh Nagar, Hyderabad

Lecture : 6:15 pm

Tea : 5:30 pm

(Please be seated by 6.00 pm)

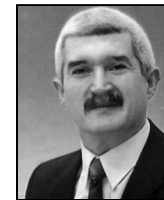
Information on the Lecture is also available on web page
<http://www.ewh.ieee.org/r10/hyderabad/faraday.html>

The Lecture

Principles of Electromagnetic Compatibility are confusing as much as that of "grounding". Misconceptions as to the mechanisms of this technique have led to many wrong concepts and implementations which today are extremely difficult to uproot : Is it better to use single point or multi-point grounding/In which frequencies? Is it better to ground a shield at both ends or at one end only? And how about to single

circuits? Hows does return current flow on the PCB? Does it follow the shortest path? The answers to all these questions lie within the domain of understanding the path of current flow, the path of least impedance. This presentation will discuss the very important concept of the "Path of Least Impedance", and the application of this principle for providing answers to the above questions and others.

The Speaker



Mr. Elya Joffe has over 25 years of experience in government and industry, in Electromagnetic Compatibility / Electromagnetic Environmental Effects for electronic systems and platforms (in particular – aircraft and aerospace). He is actively involved, as an EMC/E³ Specialist in the EMC design of commercial and defense systems, from circuits to full platforms. Mr. Joffe is also well known in Israel and abroad for his activities in EMC training and education, and has authored, developed and presented many courses on Electromagnetic Compatibility and related topics. He has authored and co-authored over 30 papers in EMC and EMC-related topics, both in the IEEE Transactions on EMC and Broadcasting, as well as in the proceedings of International EMC Symposia. Mr. Joffe is a Senior Member of the IEEE, and has served as a member of the IEEE EMC Society of the Board of Directors since the year 2000. Elya is currently serving as the 2008-2009 **President of the EMC Society of the IEEE** and is currently a member of the PSES BoD. Mr. Joffe also served as a "Distinguished Lecturer" of the IEEE EMC Society for the years 1999 through 2000.

Mr. Joffe has received several awards from the IEEE and EMC Society for his activities.

In particular, he is the recipient of the IEEE EMC Society "**Laurence G. Cumming Award for Outstanding Service**" for outstanding Service and leadership as the Israeli IEEE EMC Chapter Chairman, contributing to the EMC standardization of commercial products in Israel, promotion of the IEEE International EMC Symposium as Chairman and Contributing to the overall success of the IEEE EMC Society"; the "**Honorary Life Member Award**" of the IEEE EMC Society for "outstanding service to the EMC Society in globalization, regional and international standardization, and for on-going EMC chapters and membership initiatives"; the IEEE EMC Society "**Technical; Achievement Award**" for "over two decades of significant professional achievements in airborne and avionics EMC"; the IEEE EMC Society "**Symposium Chair Award**" "in appreciation for contribution as Chair of the 2003 IEEE Symposium on Electromagnetic Compatibility in Istanbul" and the IEEE "**Third Millennium Medal**" "...in recognition and appreciation of valued services and outstanding contributions".

Elya is also the recipient of the very prestigious "**2006 IEEE RAB Larry K. Wilson Transnational Award**" "for outstanding contribution to enhancement of the transnational character of IEEE through promotion of conferences, membership and chapter development on a regional and global basis".